Teaching Video NeuroImages: Hyperekplexia

A syndrome of pathologic startle responses

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Figure Generalized startle response elicited by unexpected auditory stimulation

Startle is defined by a long duration of EMG activity (150–400 ms) in response to unexpected specific stimuli, with a characteristic temporal and spatial organization. After the blink, the order of muscle recruitment (latencies in bold) is specific of startle; startle's generator is localized in the lower brainstem and its activity spreads rostrally to the upper brainstem and caudally to the spinal cord. The difference between the latency to onset of EMG activity in sternocleidomastoid and tibialis anterior (30 ms), between biceps and abductor pollicis brevis (25 ms), and between tibialis anterior and adductor hallucis brevis (17 ms) is disproportionately long (table 3 of Brown et al.³) and reflects a slow descending motor conduction. This recording is the 10th startle in a series of consecutive ones produced by stimuli spaced by 20 seconds, reflecting resistance to habituation characteristic of hyperekplexia.

Supplemental data
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A 47-year-old man has had pathologic startles (video at Neurology.org) since early childhood. Unexpected stimuli triggered startles and rigid traumatic falls in full awareness. Clonazepam markedly reduced abnormal startle and limited falls. Two of his children have similar symptoms.

Neurophysiologic polymyography (figure) confirmed pathologic startle.

Molecular analysis of *GLRA1*, encoding the $\alpha 1$ glycine receptor subunit, revealed a c896 G > A (pR299Q) mutation. Defective glycinergic signaling is the major cause of hyperekplexia¹ characterized by excessive startle reflexes, startle-induced falls, and continuous stiffness in the neonatal period. Stiffness gradually improves during the first years of life. Excessive startle might persist throughout life with variable severity.²

AUTHOR CONTRIBUTIONS

Dr. Mariani: acquisition and interpretation of data, drafting and critical revision of the manuscript. Dr. Hainque: acquisition, analysis, and interpretation of data, critical revision of the manuscript for important intellectual content. Dr. Mongin: acquisition of data, critical revision of the manuscript for important intellectual content. Dr. Apartis: acquisition, analysis, and interpretation of data, critical revision of the manuscript for important intellectual content. Dr. Roze: report concept, acquisition of data, critical revision of the manuscript for important intellectual content, study supervision.

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